



CTC on the LSSF RR

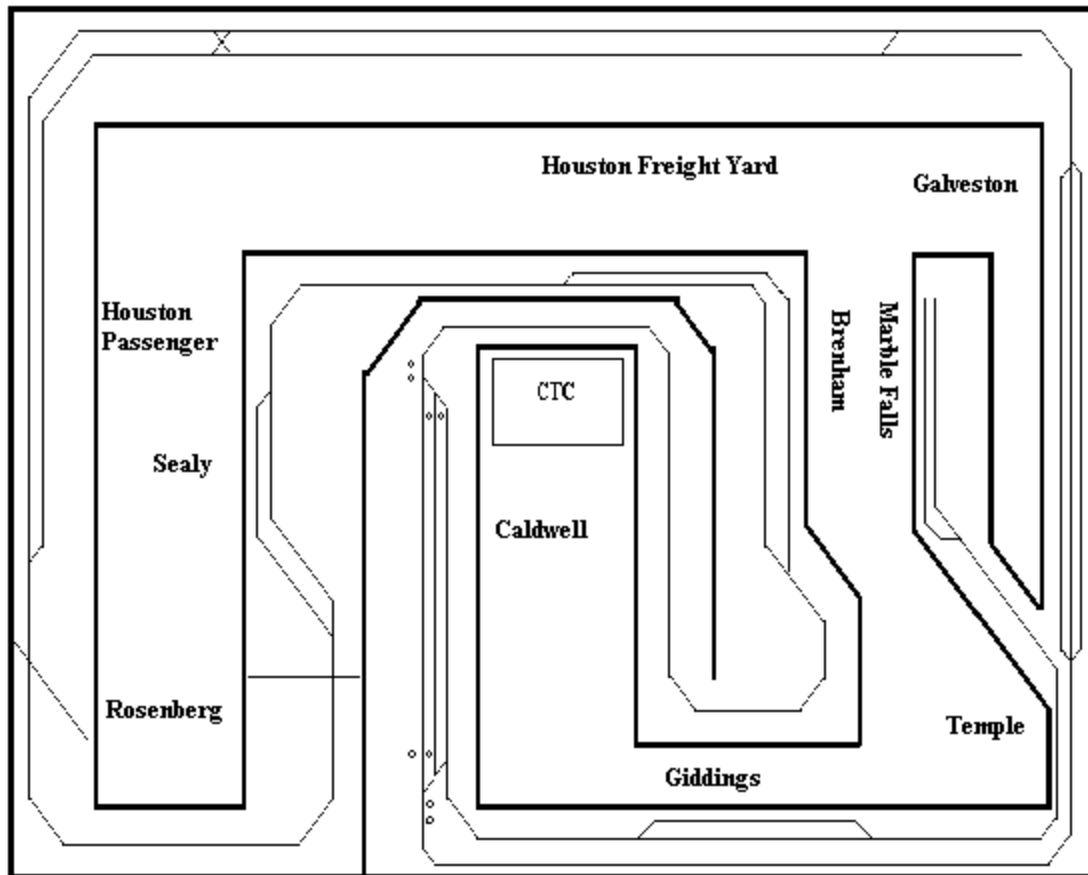
Jack Merkel

May 29 – June 2, 2013

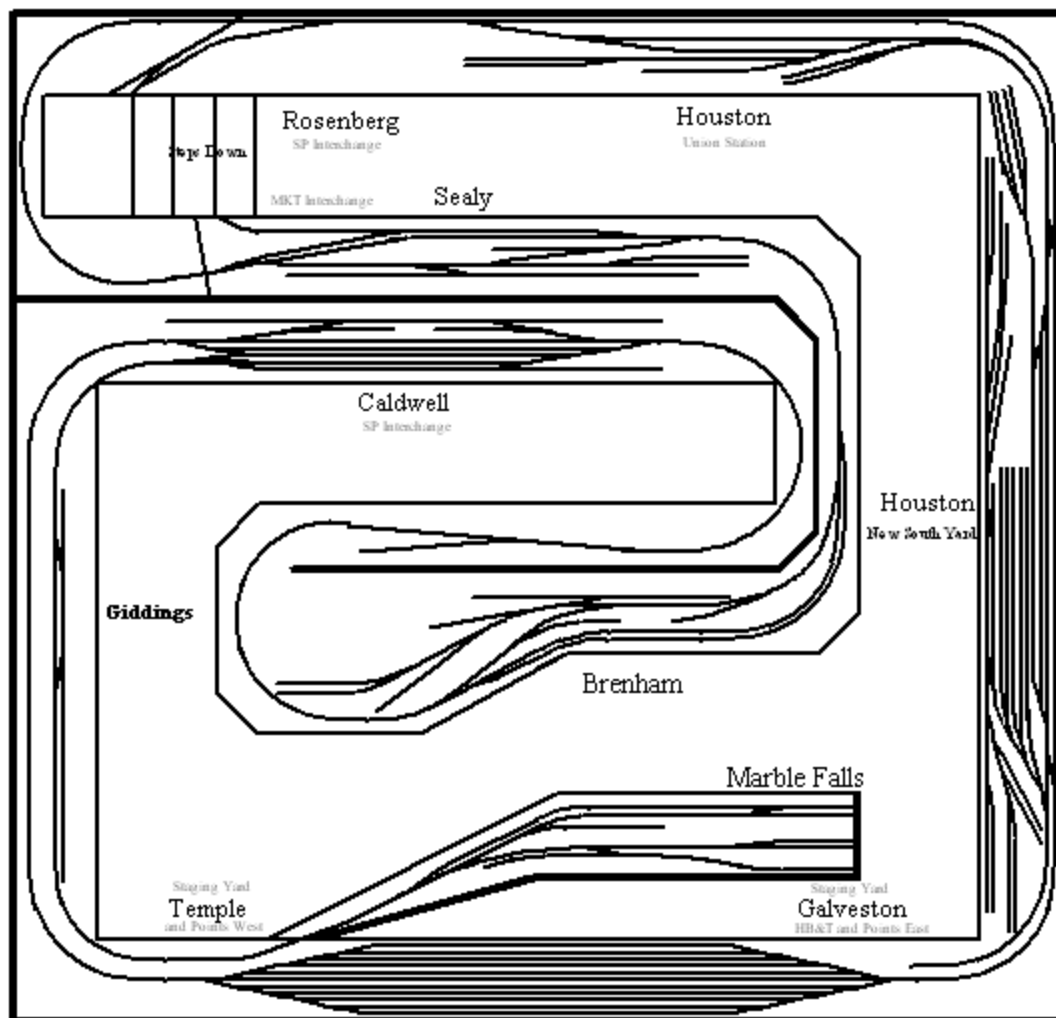
CTC Clinic

- LSSF RR Description
- CTC Design and construction
- Logic Diagrams
- Computer Code
- Local Control
- The Meet
- Telephone System

Lone Star and Santa Fe RR



Lone Star & Santa Fe RR



















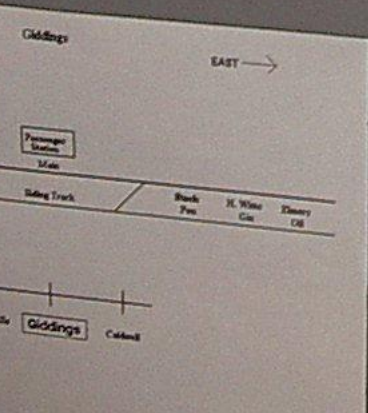














Train	Engine	Car	Locomotive	Passenger	Freight	Special
1	101	102	103	104	105	106
2	201	202	203	204	205	206
3	301	302	303	304	305	306
4	401	402	403	404	405	406
5	501	502	503	504	505	506
6	601	602	603	604	605	606
7	701	702	703	704	705	706
8	801	802	803	804	805	806
9	901	902	903	904	905	906
10	1001	1002	1003	1004	1005	1006

STOCK PENS
H. WITTE
GEN
MER'S
OIL

STOCK PENS
H. WITTE
GEN
MER'S
OIL

STOCK PENS
H. WITTE
GEN
MER'S
OIL

STOCK PENS

H. WITTE
GEN

MER'S
OIL



← 1917
Santa Fe
Marble Falls
1917



Train # 1
Train No. 100
Engine No. 100
Class: Houston TX
Origin: Houston TX
Destination: 100
DCC: N/A
Instructions:
1. Pickup train in H&BT
2. Pull past TX 4
3. Houston - Arrive New

TRACK 4

TRACK 5

Traffic Control

- Timetable and Train Orders
- Track Warrants
- Centralized Traffic Control (CTC)

CTC Decision

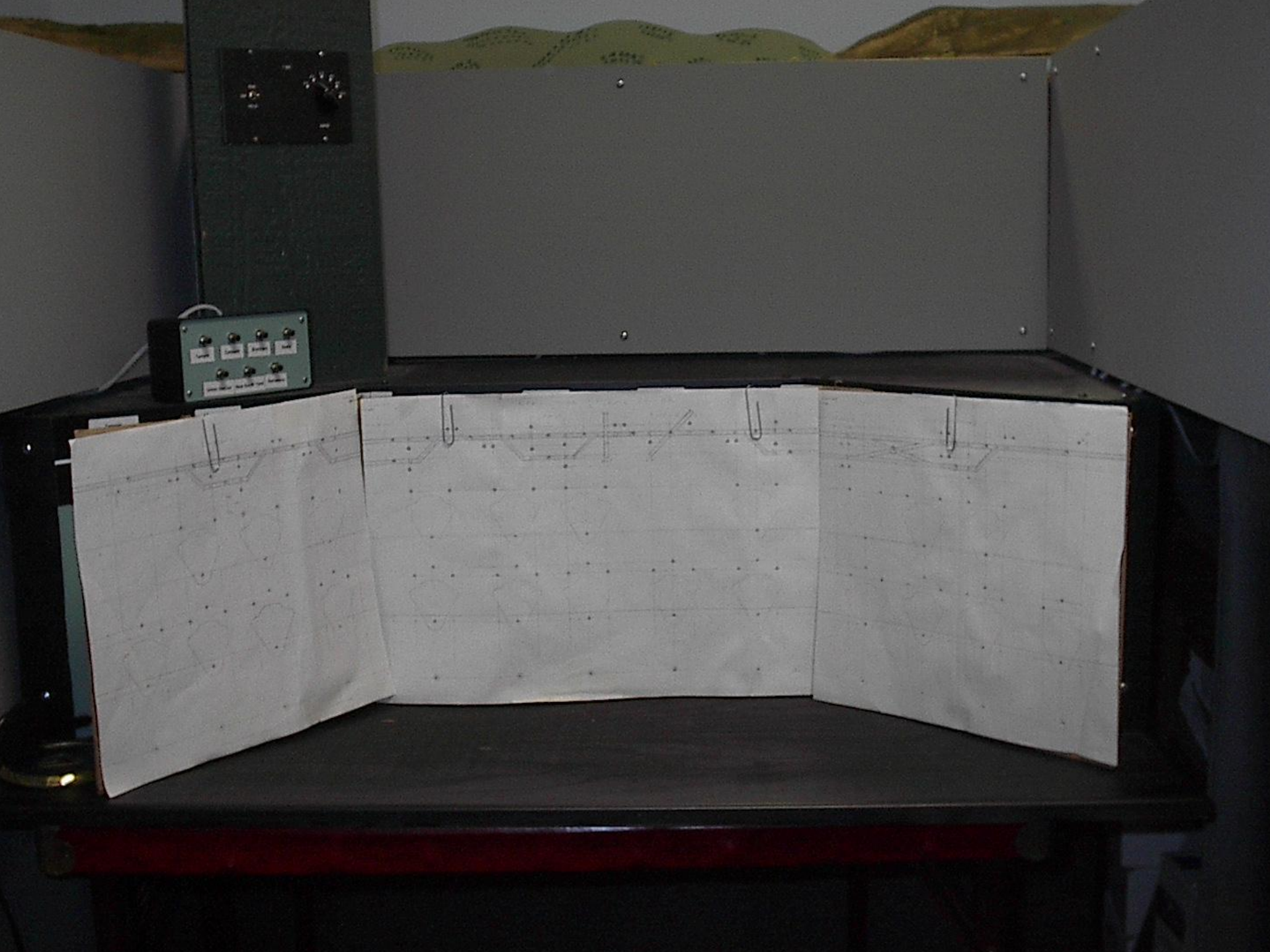
- Short main line – 173 ft
- Operate many trains – 21 in 3 hour schedule
- Signals add visual interest

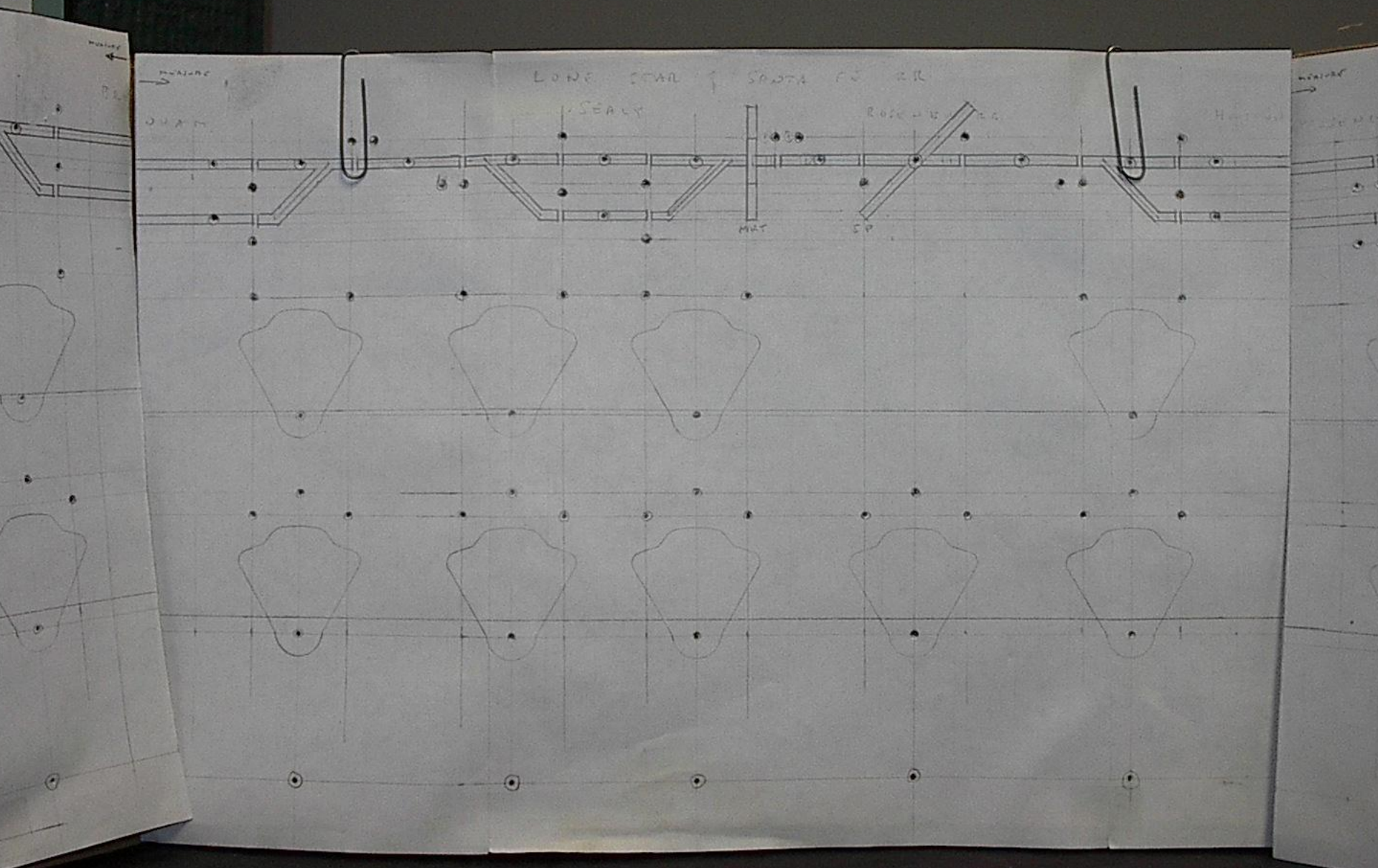
CTC Machine



CTC DESIGN

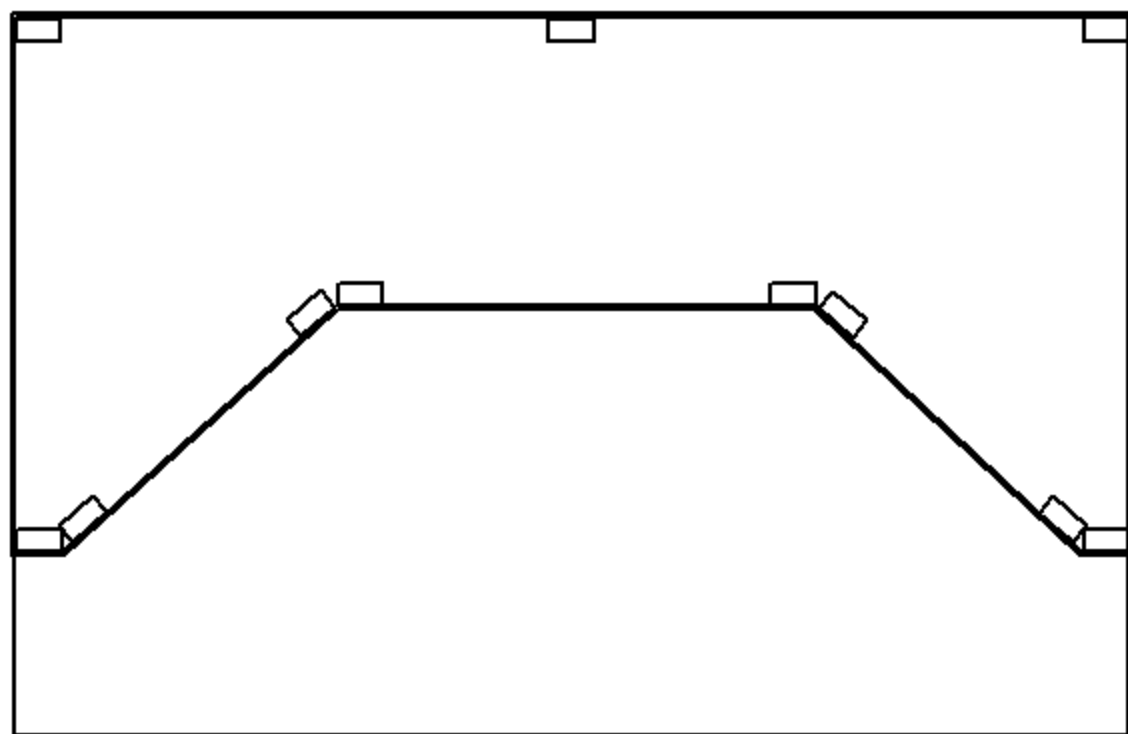
- MR 7/88
- Drew mockup on paper
- Made cardboard backing
- Switch levers – 2pos
- Signal levers – 3pos
- LED's – 3mm & 5 mm
- Led holders
- Rix plates



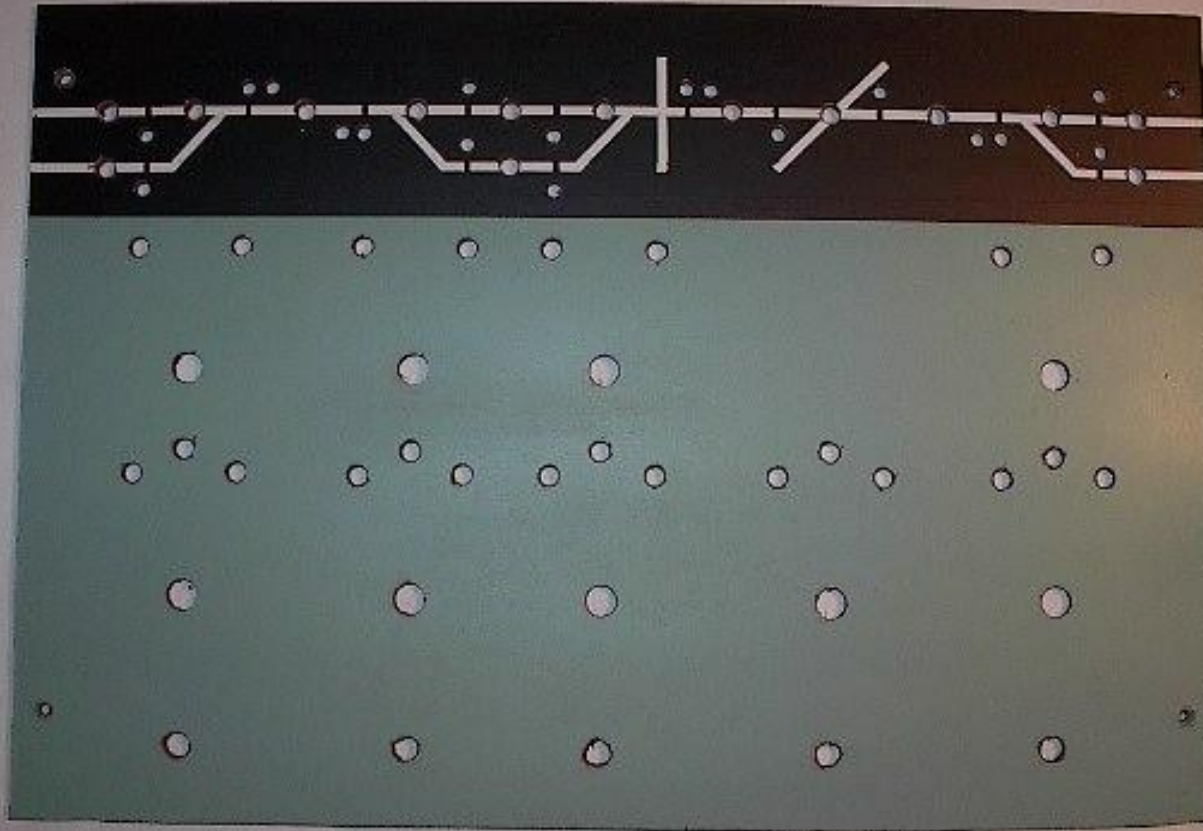


CTC Panel

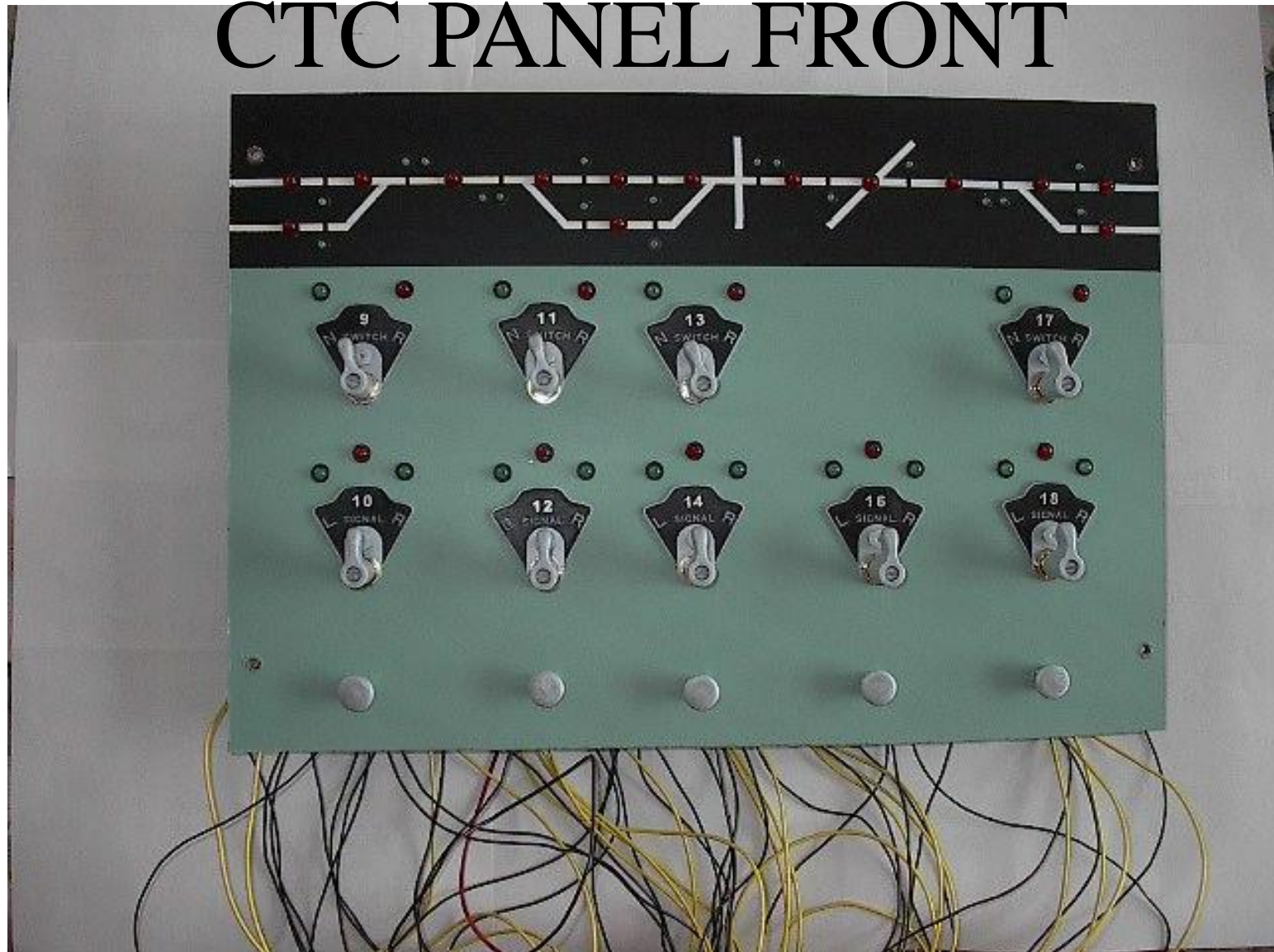
- Base – 1/2” Plywood – 24” x 37-1/4”
- Box – 1/8” Masonite
- 1x2 supports
- Panels – 11” high x 12”, 16”, 12” wide
- Paint top part white – Krylon semigloss
- Tape with automotive 1/8” tape – Scotch 3M 218
- Spray with Black – Krylon semi flat
- Mask top, spray bottom with Green – Krylon Satin
- Use mockup sheet to center punch hole locations



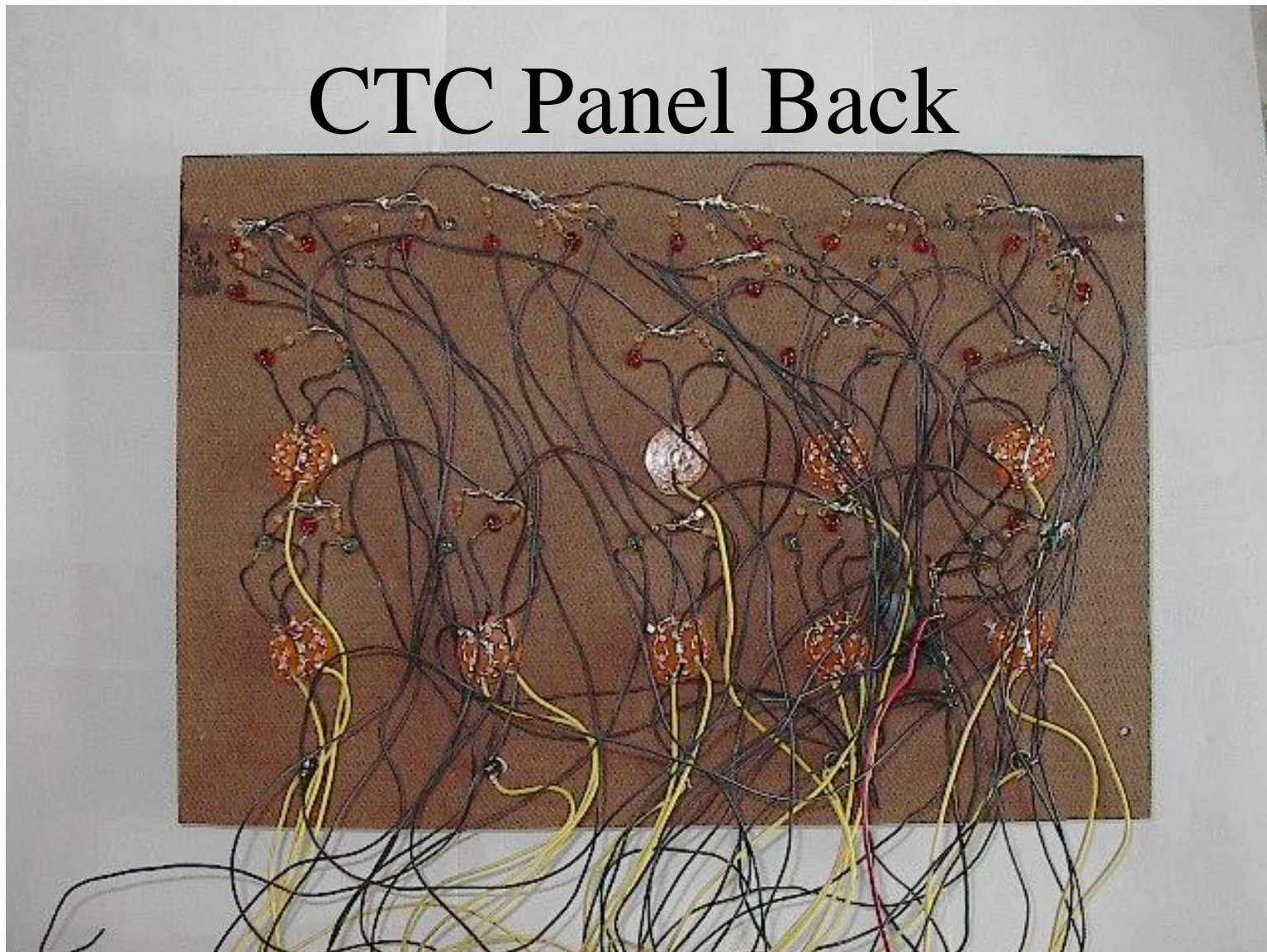
CTC PANEL HOLES



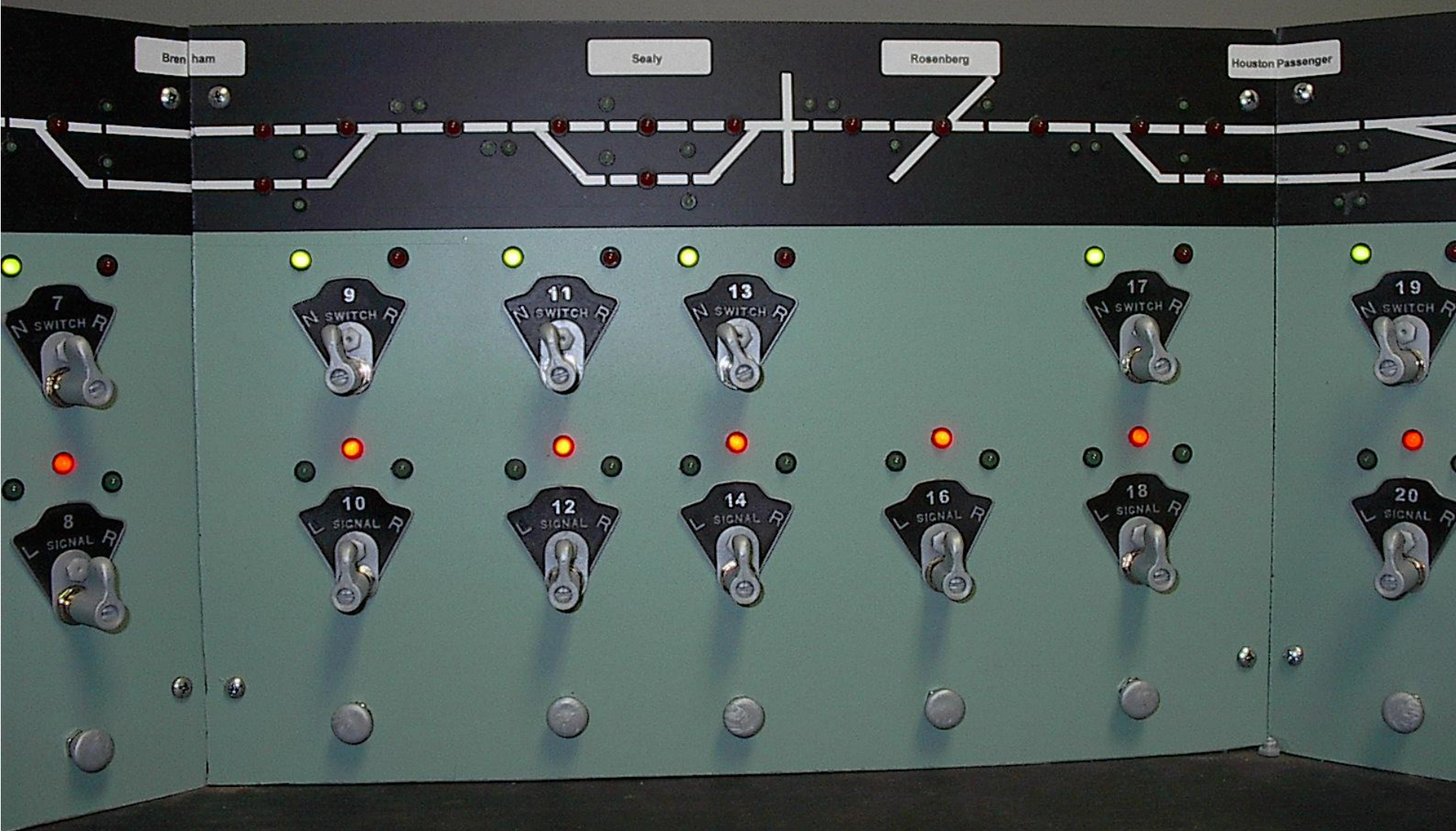
CTC PANEL FRONT



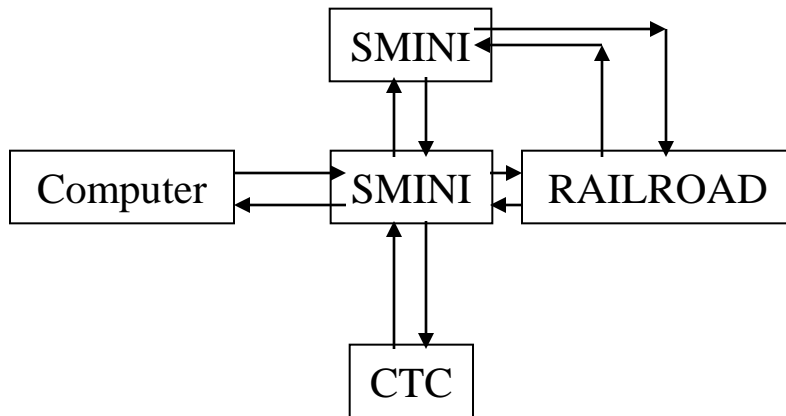
CTC Panel Back



CTC OS 10 - 18



OVERALL SYSTEM



Inputs

- CTC Switch levers
- CTC Signal levers
- CTC code buttons
- Track detectors
- Electric Locks

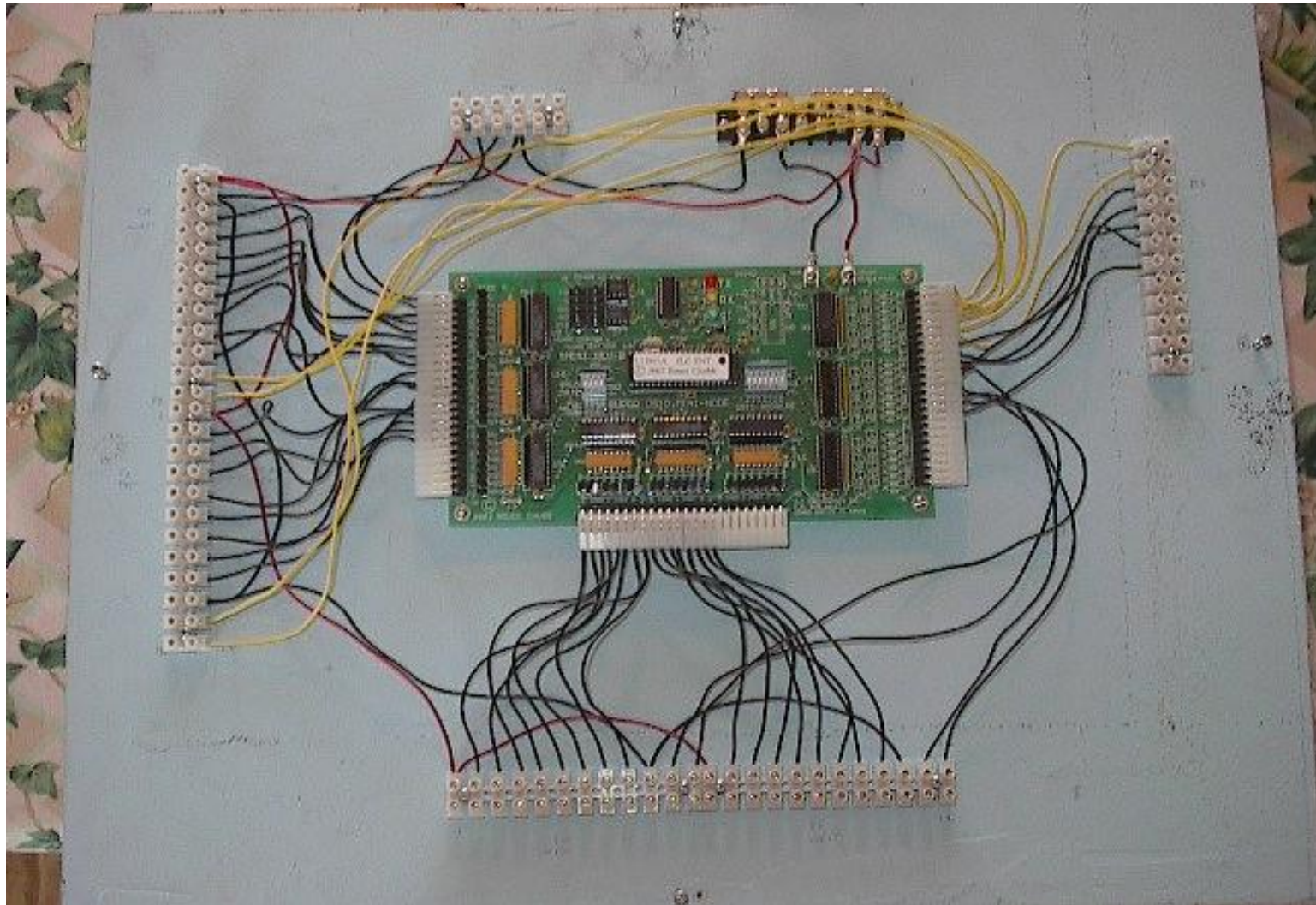
Outputs

- CTC Panel Signals
- Track Signals
- Switch Machines

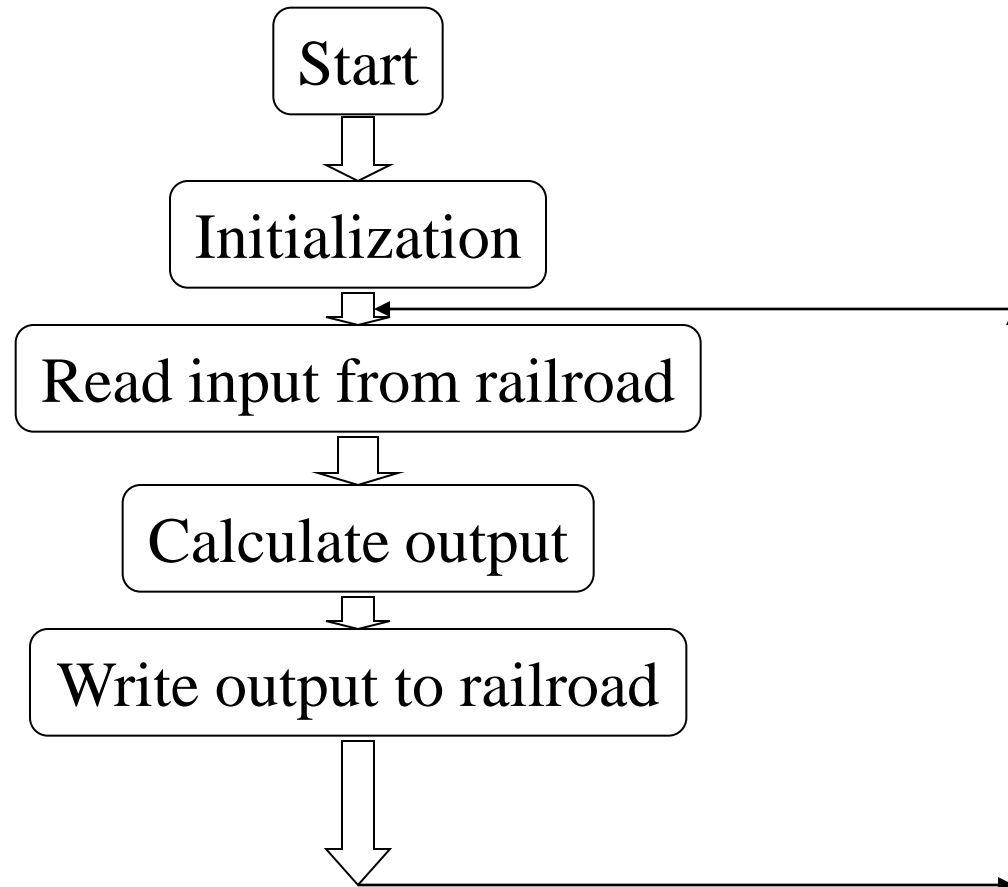
Computer

- Software

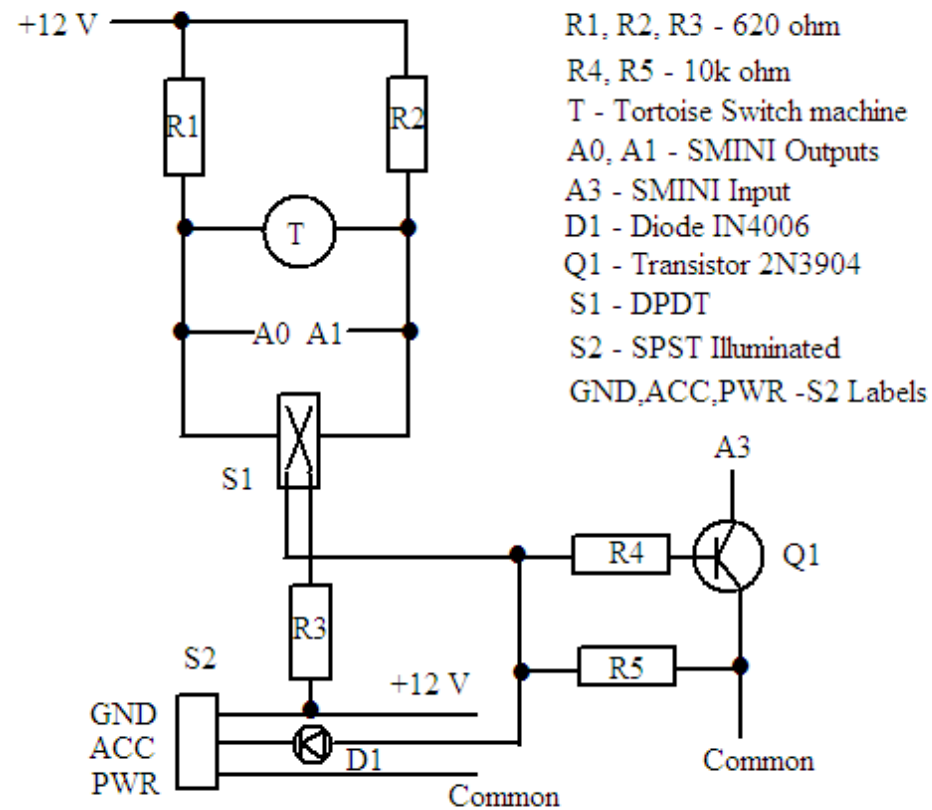
SMINI BOARD



Overall Program Structure



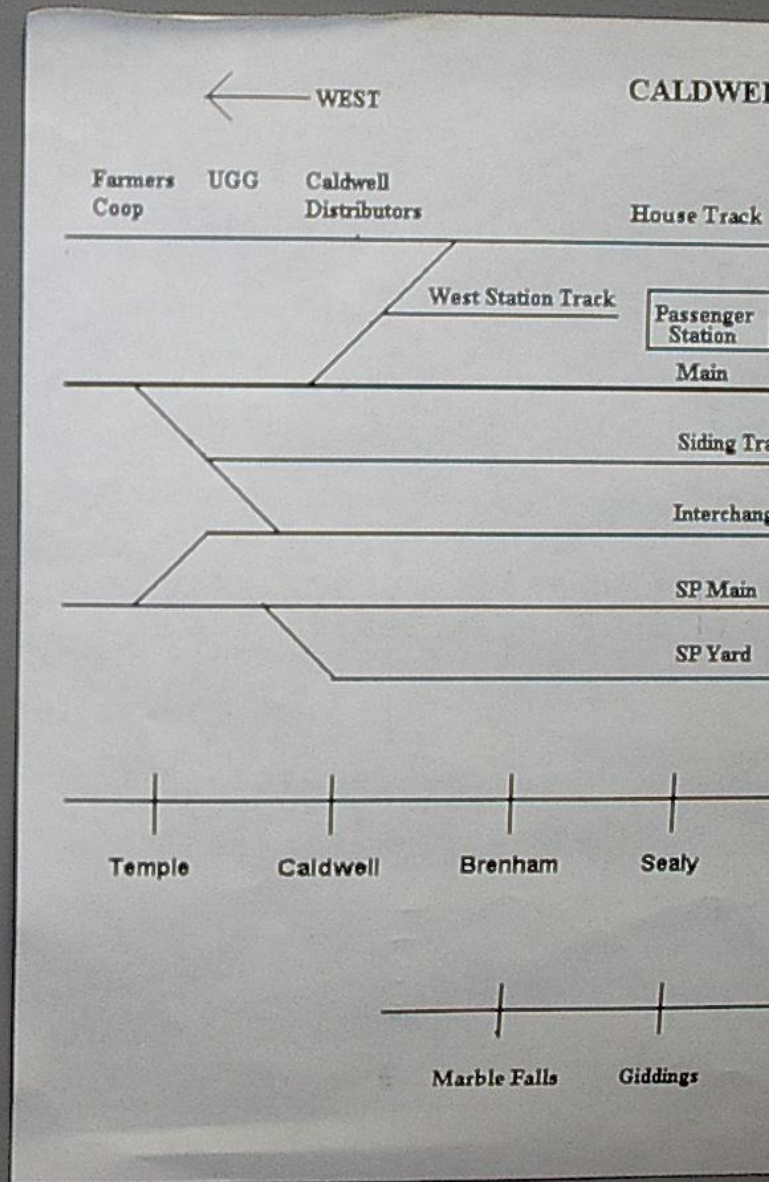
Electric Lock Circuit



3



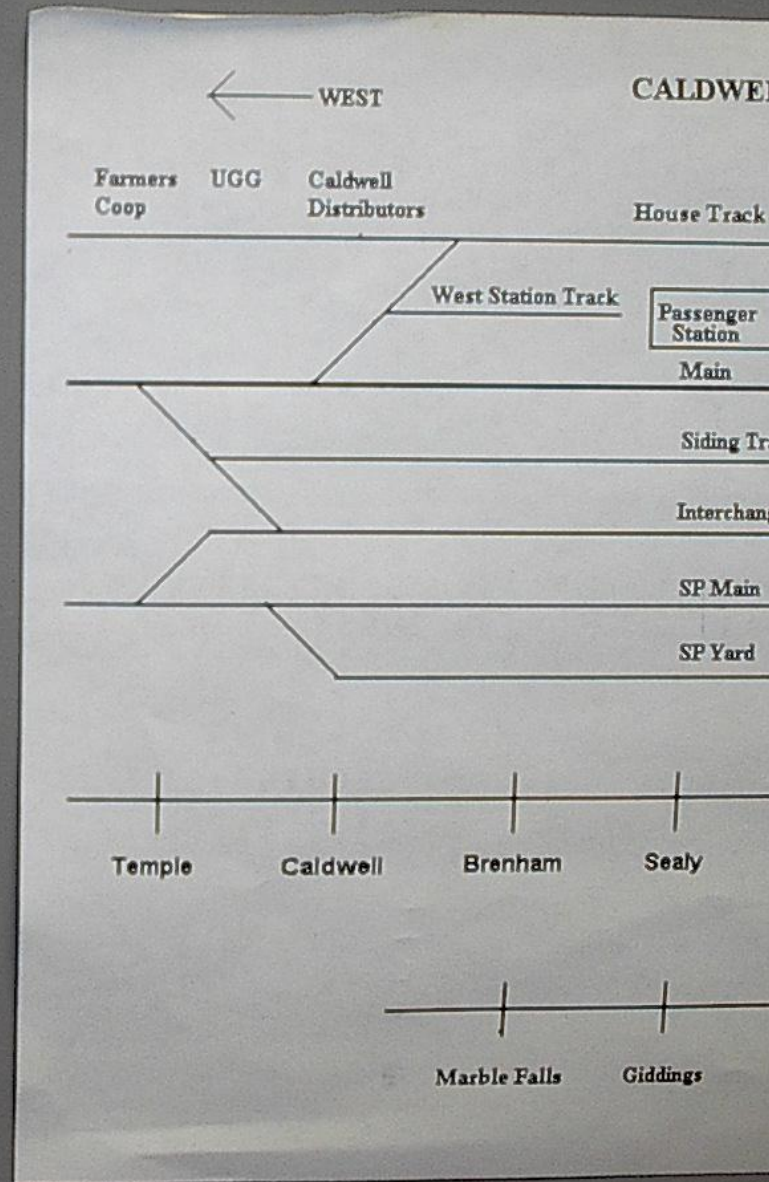
Electric Lock - Locked



3

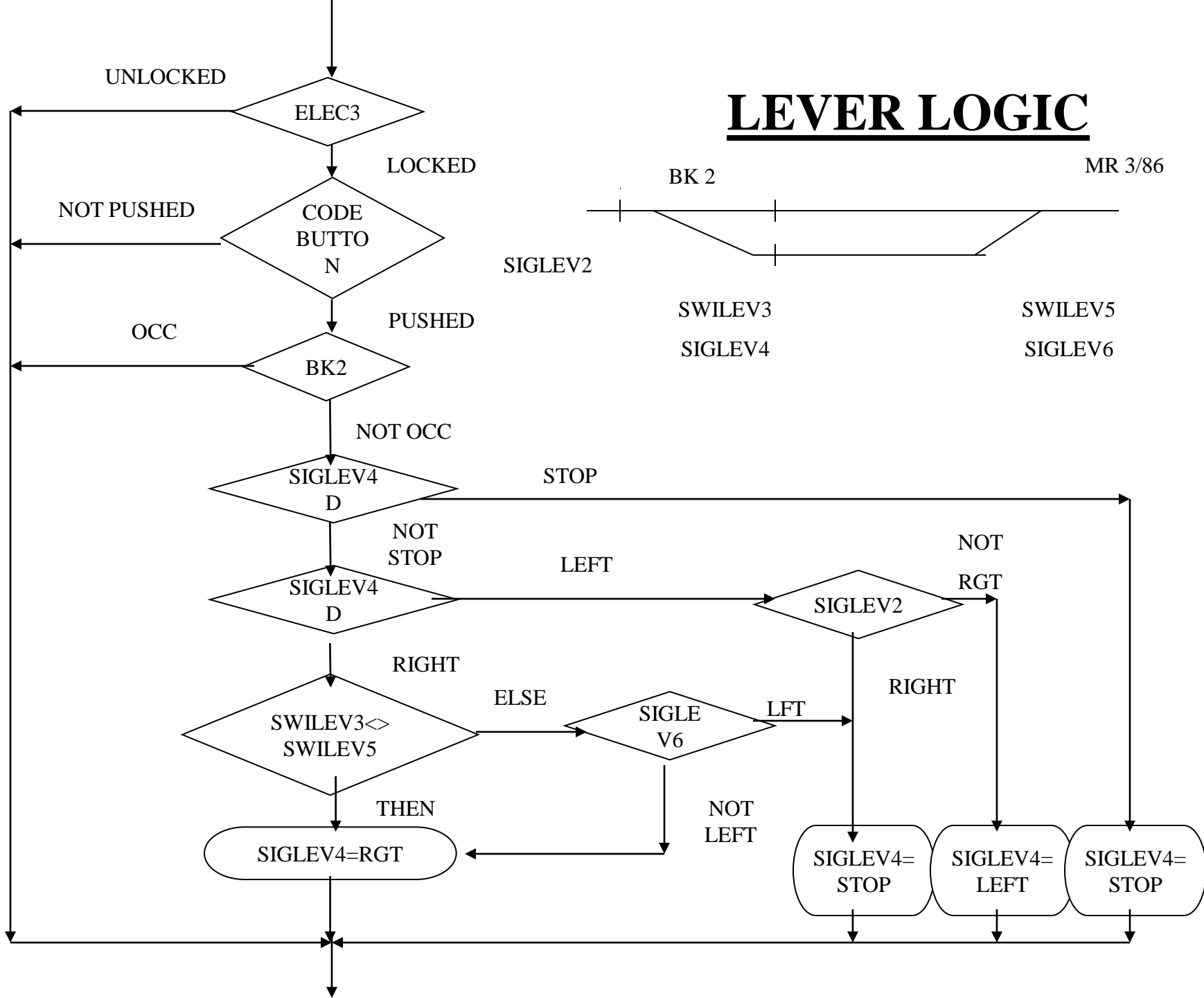


Electric Lock
Unlocked



LEVER LOGIC

MR 3/86



Lever Code

LV4:

IF ELEC3 = UNLOCKED THEN SM3 = SMOFF: GOTO LV6

IF CDEBUT4 <> PSH GOTO LV6

IF BK2 = OCC GOTO LV6

SWILEV3 = SWILEV3D

IF SWILEV3 = TUN THEN SM3 = SMN ELSE SM3 = SMR

IF SIGLEV4D = STP THEN SIGLEV4 = STP: GOTO LV6

IF SIGLEV4D = LFT GOTO BRLV2

IF SWILEV3 <> SWILEV5 THEN SIGLEV4 = RGT: GOTO LV6

IF SIGLEV6 <> LFT THEN SIGLEV4 = RGT: GOTO LV6

IF SIGLEV6 = LFT THEN SIGLEV4 = STP: GOTO LV6

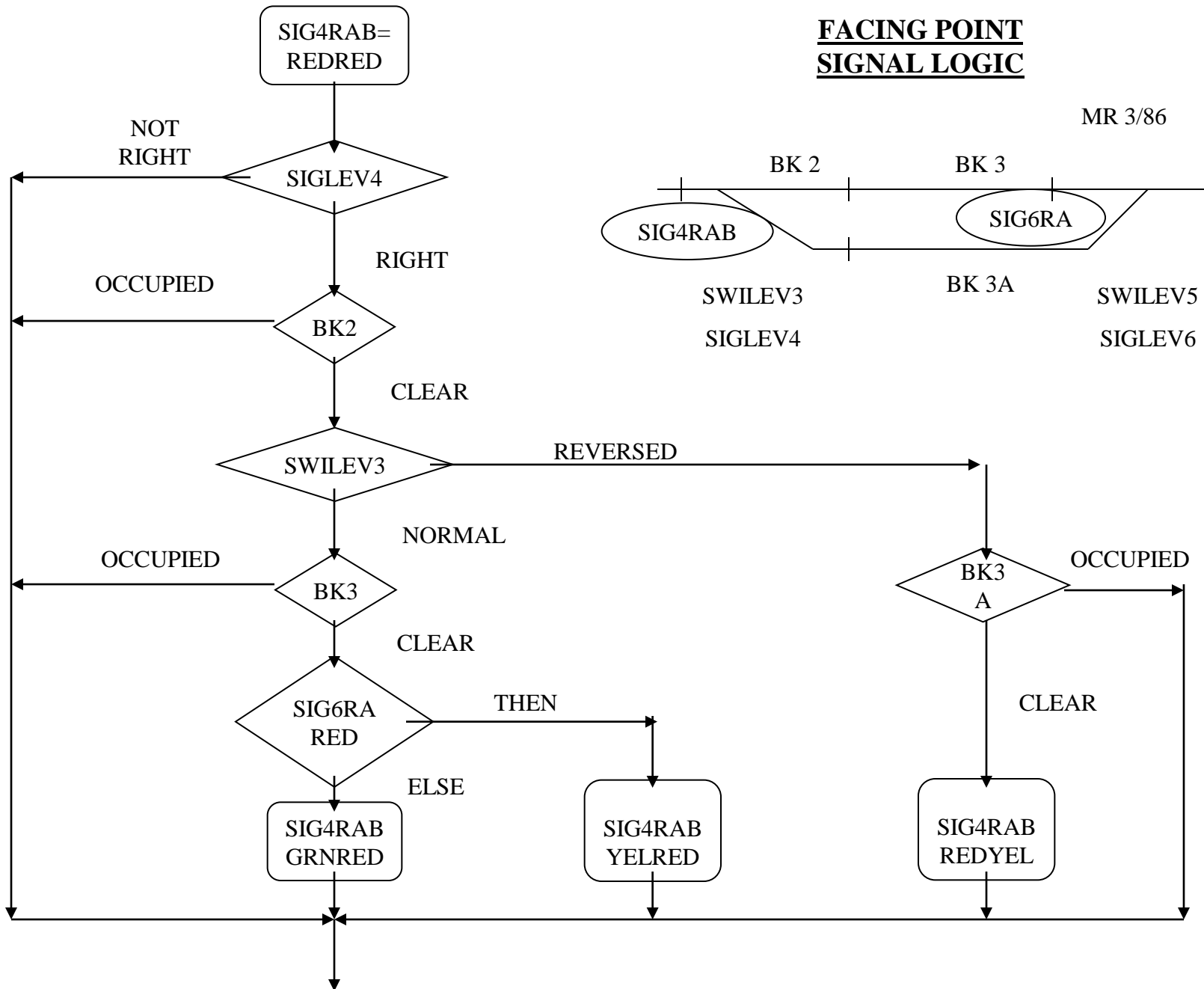
BRLV2:

IF SIGLEV2 <> RGT THEN SIGLEV4 = LFT ELSE SIGLEV4 = STP: GOTO LV6

LV6:

FACING POINT SIGNAL LOGIC

MR 3/86



FACING POINT SIGNAL CODE

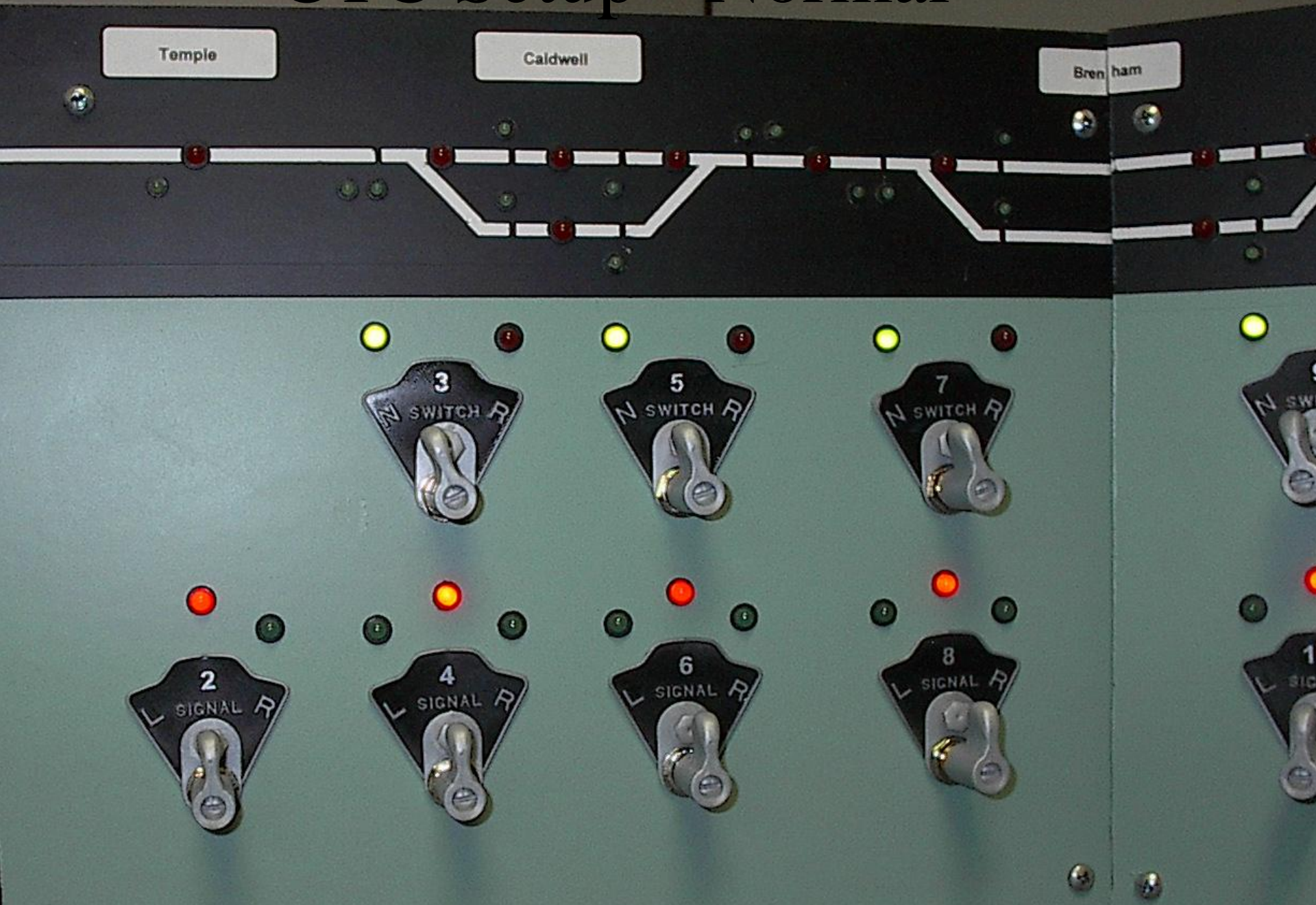
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OS4:
SIG4RAB:
SIG4RAB = REDRED
PNLSIG4RA = DRK
PNLSIG4RB = DRK
IF SIGLEV4 <> RGT GOTO SIG4L
IF BK2 = OCC GOTO SIG4L
IF SWILEV3 = TUR GOTO OS4BK3A
IF BK3 = OCC GOTO SIG4L
IF SIG6RA = RED THEN SIG4RAB = YELRED ELSE SIG4RAB = GRNRED
PNLSIG4RA = GRN: GOTO SIG4L
OS4BK3A:
IF BK3A = OCC GOTO SIG4L
SIG4RAB = REDYEL
PNLSIG4RB = GRN
SIG4L:
```

What if it doesn't work?

- Start with CTC panel first. Get switches and switch LED's working correctly.
- Start with one OS section and one panel signal. (no field signals yet). Get it working correctly first. Then move to next signal in same OS section.
- Put some print statements in code.
- What do print statements say should be happening? What is actually happening?
- When CTC panel signals all work, move to field signals.

THE MEET

CTC Setup - Normal



Temple

Caldwell



CTC Setup - Meet







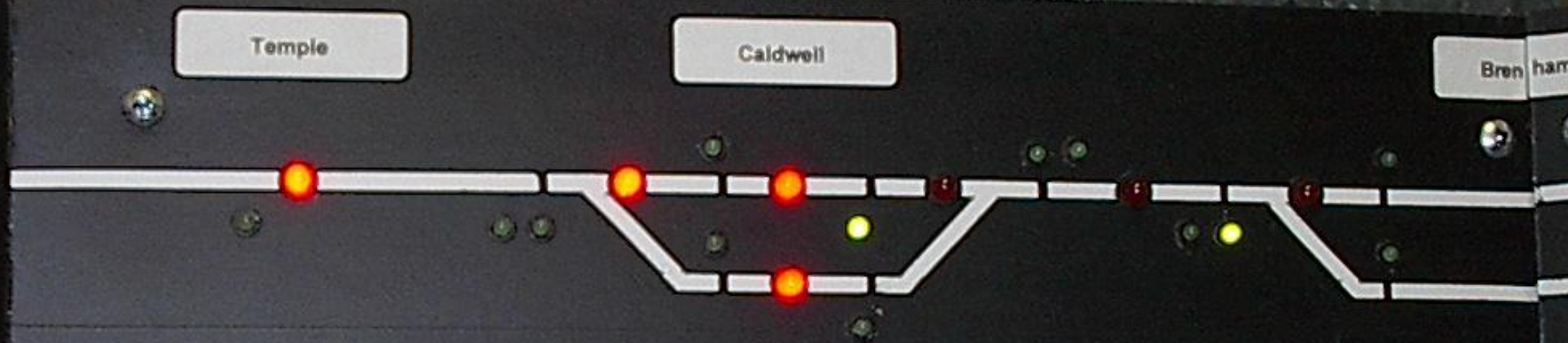


The image shows a CTC Reset panel. At the top is a track diagram with a white line on a black background. It features several yellow lights and one red light in the center. Below the diagram is a light green panel with eight toggle switches arranged in two rows of four. Each switch has a black label with white text. The top row switches are labeled 3, 5, and 7, with 'N SWITCH R' below the numbers. The bottom row switches are labeled 2, 4, 6, and 8, with 'L SIGNAL R' below the numbers. Each switch is flanked by two small circular lights: a yellow one on the left and a red one on the right. The switches are currently in various positions, with some showing the 'N' or 'L' side and others showing the 'R' side.

CTC Reset







CTC Status







CTC Reset





Dispatcher Tools

- Dispatcher Call Sheet
- Dispatcher Log Sheet
- Dispatcher Work Time Log

Dispatcher's Lineup

Dispatcher's Lineup

<u>Train</u>	<u>Call Time</u>	<u>Location</u>	<u>Stg Tk</u>	<u>C&E</u>	<u>No. Cars</u>	<u>Destination</u>	<u>Description</u>	<u>Stops</u>
39	0600	Kansas City	5			Houston	Manifest Frt	CA,BR,SE
16	0600	Galveston	10			Chicago	Texas Chief	HO
Extra	0600	Galveston				Chicago	TOFC	Non Stop
26/25	0700	Houston	-			Sealy	Sealy Turn	SE,RO
203	0700	Temple	3			Houston	Local Pass	CA,BR,SE
28/27	0800	Houston				Brenham	Brenham Turn	SE,BR
40	0900	Galveston	9			Kansas City	Reefer	HO,CA
251	1000	Galveston	2			Houston	Local Pass	Non Stop
15	1100	Chicago	7			Galveston	Texas Chief	HO
290	1200	Houston				Temple	Mail	SE,BR,CA
Extra	1300	Kansas City	11			Galveston	Grain	Non Stop
292	1400	Galveston	2			Temple	Mail	HO,SE,BR,CA
294	1500	Galveston	2			Houston	Mail	Non Stop
252	1600	Houston	-			Galveston	Local Pass	Non Stop
37	1700	Kansas City	11			Galveston	Grain	SE,HO
202	1800	Houston	-			Temple	Local Pass	SE,BR,CA
38	1900	Houston	-			Kansas City	Manifest Frt	SE,BR,CA
36	2000	Galveston	8			Kansas City	TOFC	HO
<u>Other Trains (operated by Houston Yard)</u>								
451	-	Beaumont	1			Houston	Tank Car	
533	-	Houston	4			Houston	HB&T Transfer	
452	-	Houston	-			Beaumont	Tank Car	
556	-	Houston	-			Houston	HB&T Transfer	
<u>Other Trains (operated by SP)</u>								
902	-	Marble Falls	-			Caldwell	Local Pass	
955/956		Caldwell	-			Caldwell	Quarry Train	
999	-	Caldwell	-			Caldwell	Caldwell Switcher	
903	-	Caldwell	-			Marble Falls	Local Pass	

Siding Lengths (Count engine and caboose as 4 cars)

Sealy	16 Cars	Brenham	22 Cars	Caldwell	18 Cars
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Dispatcher Log Sheet

				Santa Fe						Dispatcher: _____				
				Southern Division						Date: _____				
Westward								Eastward						
							Train							
							Conductor							
							Engineer							
							Engines							
							Caboose							
							No. Cars							
							Station							
							Temple							
							Caldwell							
							Brenham							
							Sealy							
							Houston Pass.							
							Houston Ft.							
							Galveston							
Notes								Notes						

Dispatcher Work Time Log

Work Time Log							
<u>No.</u>	<u>Issued</u>	<u>Location</u>		<u>Time</u>		<u>Released</u>	
	<u>To</u>	<u>From</u>	<u>To</u>	<u>From</u>	<u>To</u>		
1							
2							
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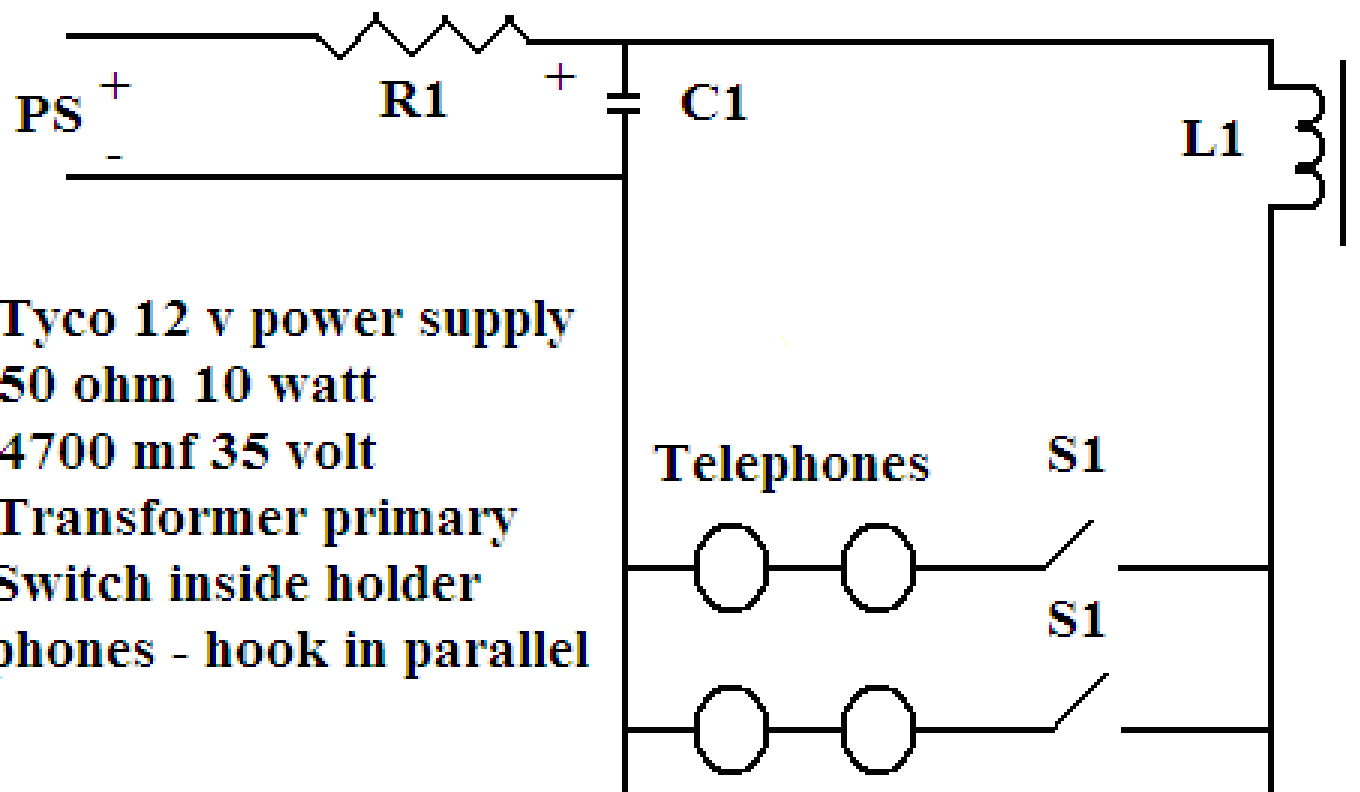
Communication

- Voice
 - Noisy
- Radio
 - Carry radio, throttle, car cards
 - Hear all conversations
- Telephone

Telephone

- Telephone Components
 - Telephonecomponents.com
- Handset, switchhook holder, two switches inside holder

Telephone Circuit



PS - Tyco 12 v power supply
R1 - 50 ohm 10 watt
C1 - 4700 mf 35 volt
L1 - Transformer primary
S1 - Switch inside holder
Telephones - hook in parallel

Dispatcher Call System

- Need method for dispatcher to call local station
- Call system employed

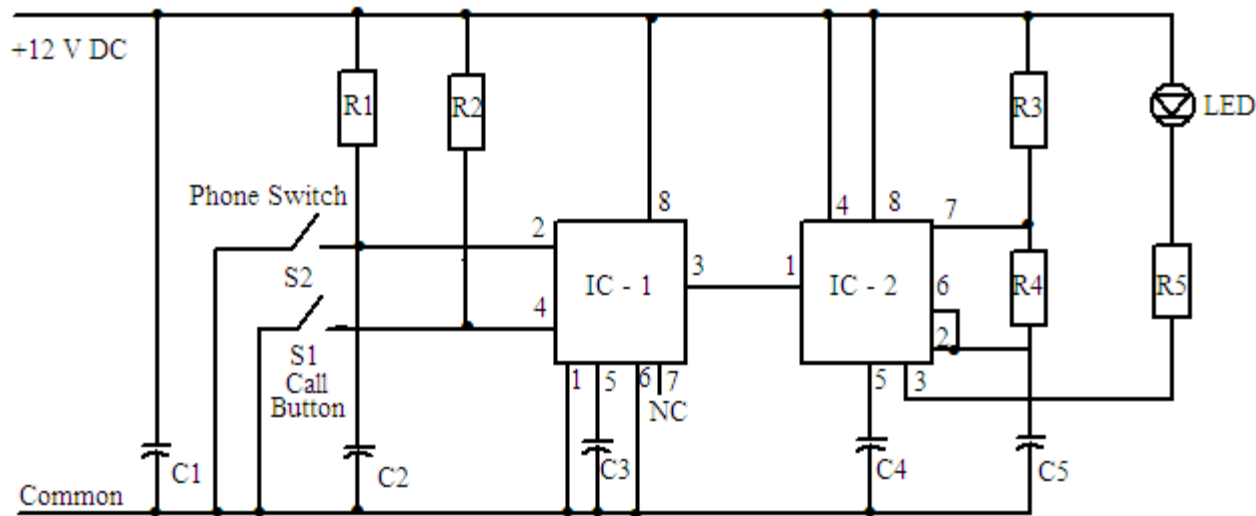
Telephone



Call Box



Call Circuit



Protocol

- Check to see if line is clear
- Announce your location
- Sample conversation

Sample Conversation

- Conductor (C) – Temple
- Dispatcher (D) – Go ahead Temple
- C – This is conductor Pearson on Train 39.
We are ready to leave Temple for Caldwell.
- D - How many cars do you have?
- C – 15 cars.
- D – Follow signals.

References

- Marker Lamp – Spring 2012 (on line)
- Design – MR July 1988
- Logic Diagrams – MR March 1986
- Telephones – Telephonecomponents.com
- Call Circuit – MR August 1982
- IC 555 tutorial –
uoguelph.ca/~antoon/gadgdets/555

The End

